Planting systems; planting and establishment
Preliminary Operations

• After selecting a suitable site,
  – Clear the land of all vegetation (shrubs & trees).
  – Land should be ploughed deep and leveled.
  – A green manure crop should be grown and ploughed in.
Planning the Orchard

• Prepare a plan which will enable the grower to provide:
  – Most economic orchard management
  – An economic layout and location of roads, drains, irrigation channels, hedges and windbreaks, etc.
LAYOUT SYSTEMS

• Layout means locating the position of trees, roads and buildings in the orchard being established.

• Systems of layout refer to the orderly ways of planting the trees.
Advantages of Layout

• Orchard operations like inter-culture and irrigation are carried out easily.
• Enables equal distribution of area under each tree.
• Results in least wastage of land.
• Makes supervision more easy and effective.
• Systematic extension of the orchard can be done in future.
LAYOUT SYSTEMS

- Square system
- Rectangular system
- Equilateral triangle or Hexagonal System
- Quincunx or Diagonal system
- Contour system
- Terrace system
Square System
• **Square system** – Simplest and most common for planting of orchards.
• Distance from plant to plant and row to row remains the same.
• Four adjacent plants of two rows form a square.
• Easy to layout and permits cross cultivation.
• Only defect is presence of vacant space in the centre till the plants grow up sufficiently.
Quincunx System
• Quincunx system - similar to the square system except that an additional plant (filler) is planted in the centre of each square.

• Accommodates almost double the number of plants than the square.
Fillers

- usually not permanent trees and planted to fill the central space.
- should be precocious and short-lived.
- serve as source of additional income till the main trees come into bearing.
- make cross cultivation difficult.

- Delays in removal of fillers - adversely affects the performance of main plantation.
- Fillers are planted
  - when plant to plant distance is more (> 8m) and
  - plants are expected to come into bearing after a number of years.
Rectangular System
• **Rectangular system** - Adopted for planting of those fruit trees which require less distance between plant to plant than row to row distance.

• It has almost all the advantages of square system but cultivation between plant to plant is difficult.
Hexagonal
• Equilateral triangle or Hexagonal System – Trees are planted at the corners of equilateral triangles.
• Differs from the square system:
  – distance between the rows is less than the distance between the trees in the rows,
  – but the distance from tree to tree in six directions remains the same.
• Accommodates approximately 15 per cent more trees per unit area than the square system.
• Advantageous only where the maximum use of the land is desired, especially on fertile soils
• Contour system: meant for hilly areas only.  
  - Trees will be in a straight line from one side only.
  - Rows are represented by lines passing through the same contour.
Planting Distance

• To provide adequate space to the plant for normal development
• To permit
  – proper intercultural operation
  – easy passage of air and sunlight
  – proper maintenance or orchard sanitation.
• Planting distance depends on
  – nature of soil,
  – type of plant (whether grafted or seedling)
  – variety

*Standard planting distance for mango is 8-10 m
**Dwarf varieties like Amarpalli at 3.0 x 3.0 m
*High density planting of Dashehari mango at 3X2.5m spacing.
Planting Board
Digging of Pits

• Before digging the pits, two outer pegs are fixed with the help of planting board.
• Already fixed peg is kept in the central notch to mark the right point to plant each tree.
• During digging of actual pit, the central peg is removed and two outer pegs remain undisturbed.
• These outer pegs help in locating the point where the plant is to be put in.
• Dig the pits 2-4 weeks in advance
• The ideal pit size would be 1X1X1m dimension.
• When the soil is fertile and does not have any type of hard pan, the size of pits may be of 50X50X50cm in dimension.
Filling of pits

- Keep the soil from upper half on one side and from lower half on other side.
- Allowed to weather for 2-4 weeks for disinfection by sunlight.
- Mix a mixture of
  - well-decomposed FYM (50 kg),
  - superphosphate (100 gm) and
  - chloropyriphos (10 ml/10 litre water) in upper as well as lower soil of the pit.
- Press the soil well to remove air pockets inside the pit.
- Upper level of pit is kept 15cm above from the field level.
- After filling, irrigate the pits to settle down the soil.
Time of Planting

- Ever green plants are planted during **rainy season** (July to August) and if irrigation facilities are available the even in **spring season** (February to March) in North India.
- Plant in evening when the high humidity prevails in the atmosphere.
- Deciduous plants are planted in Winter season (December – February).
- Irrigate just after planting.
Planting of Grafts

• At planting, dig a slightly bigger hole than the size of earth ball at the already marked point.
• Remove the wrapping material from the ball.
• Place earth ball in the hole in such a manner that the plant remains straight and collar portion of plant is in the level or slightly higher than the ground level.
• After placing, the soil taken out from hole is pressed firmly around it to set the plant firmly in the field.
• During pressing of soil, the earth ball should not be broken.
• Immediately after planting irrigation is done, the frequency of irrigation depends on the weather.
• Regularly check the plants to detect the faults like sinking of soil, tilting of plant and cracking in basin etc.
• Maintain sufficient moisture till the plants start new growth in the field.
Protection of Young Plants

- Provide **staking**
- Save the plants from **frost** by covering them
- Cover on all sides except **North-West** and **South-East** so that the sunlight may enter in morning and evening times.
- Thatching can be of any type of **dried grasses** or of **polyethylene sheet**.
- Thatching material is used in winter months (frost) and in summer (hot winds)
- **Irrigate** frequently (at 7days interval) in hot weather
- Regular **weeding** of plant basin
- White washing the stems, paper/gunny bag wrapping, Biofencing.
Early Deblossoming

- Young plants prepared through asexual methods of propagation start flowering immediately.
- This adversely affects the growth and vigour particularly when such types of plants are allowed to set fruits.
- This fruiting is on the expense of growth and hinder the formation of strong framework of the plant.
- Remove these inflorescences immediately after emergence so that it may not disturb vegetative growth.
- The deblossoming should continue till the plant attains three to four years of age.
- By this time plant attains normal size and it is physiologically sound to bear the fruits.
Interculture and Intercrops

• Good sanitary condition .
• Timely hoeing and weeding is essential
• Don’t neglect the orchard in pre-bearing stage by paying more attention to the intercrops.
• Neglected orchards prove costly as fruiting is delayed and longevity and productivity are reduced.
• Clean cultivation throughout the year is not desirable
• Utilize vacant space between the trees for growing intercrops such as vegetables and legumes to earn extra income from the mango orchard.
Wind Breaks

• Before planting orchard, reserve some place for planting of wind breaks at the border sides of orchard from which hot and high winds and frost are expected.

• Windbreak trees are commonly tall having dense foliage and keep the surrounding atmosphere humid.

• Minimize the wind velocity, low or high temperatures

• Trees generally used as windbreak, are seedling mango, mulberry, shisham, jamun, bamboo etc.

• These are usually planted close to each other to provide an effective shield.

• Tall growing trees like shisham and jamun planted 6m apart while low headed trees like mulberry and carambola planted at 7m distance.
• Grow **filler fruit plants** such as papaya, peaches, strawberry, pineapple, phalsa, guava etc (in mango orchards)
• Remove fillers later on when they start touching the main plants
• The vegetable crops are onion, tomato, radish, carrot, beans, cauliflower, cabbage and palak.
• Avoid heavy feeders like colocasia, ginger, turmeric and grain
• Plant intercrops away from basins
• Provide additional inputs for intercrops
Intercultural and Intercrops--contd

• Other than intercrops some green manure crops like sunhemp in light soils and dhaincha in heavy soils may also be grown to protect the orchard soil from erosion and also for enriching the soil fertility.

• These crops sown before rainy season and ploughed after

• Take the intercrops in initial stage of orchard establishment till the main crop plants come in full bearing.
Thanks